CARBON HEATING APPARATUS ~~USING~~ UTILIZING A GRAPHITE FELT AND METHOD OF MANUFACTURING ~~METHOD~~ THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a carbon heating apparatus ~~using~~ utilizing a graphite felt and a manufacturing method thereof. More ~~specifically~~particularlly, the ~~invention relates to the~~ carbon heating apparatus ~~using a graphite felt and manufacturing method thereof characterized in that: in~~comprises a carbon heater ~~used in equipment for heating a room or applying heat, and so on by an electrical heating characteristic~~made of a carbon fiber ~~, wherein the electrical heating characteristic is produced by sealing the carbon heater, formed by cutting the carbon fiber into~~forming with a predetermined section and length and heat treated in a hydrogen gas atmosphere under a preset high temperature to make uniform surface cut structure, ~~into~~ a quartz glass tube for enveloping and sealing the carbon heater, and a pair of termials for securely attaching both ends of the carbon heater to prevent unwanted sparks and looening the carbon heater.~~a particle structure on a side face, formed more unevenly over a particle structure on a plane by cutting a plane shape of the mineral carbon fiber into the predetermined section and length, becomes a stable structure by a predetermined process, i.e., a heat treating process; and an arch discharge or a terminal secession produced between the carbon heater and a feeding terminal can be prevented by using superior metals in contraction strength or compression strength, in both ends of the heat treated carbon heater.~~

2. Description of the Related Prior Art

Generally, ~~in the~~a carbon heating apparatus ~~using as a heat source heat produced by the arc discharge and Joule heat and~~ producinges ~~a high~~extreme temperatures ~~of heat by the~~due to arc discharge and Joule heating through the contact resistance between carbon particles~~, produced~~ in response to an electric current flowing into ~~the~~ both ends of the carbon particles received in an insulator.~~,~~ ~~since~~ Since the carbon fiber was invented ~~at an early age~~many years ago, the carbon heating apparatus ~~has been constituted to~~for ~~produce~~ producing heat ~~by applying electricity to the both ends of the carbon heater, wherein the both ends of the carbon heater use~~ employs ~~directly~~ carbon yarns, a plurality ~~number~~ of twisted carbon yarns ~~spun~~, or a textile type of ~~a~~ graphite felt cut as needed by applying electricity to both ends of the carbon heater. Also, ~~although~~ the carbon heating ~~apparatus~~ element is ~~constituted to form a smooth cycle~~enveloped in a glass tube ~~by injecting~~filled with an inert gas, typically using a silica glass or a hard glass.~~,~~ However, the hard glass is not ~~fit~~ suitable to ~~be a heater which~~maintain continuously ~~produces a~~at extremely high temperatures ~~of heat~~. Accordingly, a carbon heater ~~in portions~~ for continuously producing ~~a~~ high temperatures, such ~~every process~~ as ~~in~~ a semiconductor manufacturing apparatus ~~has been used from an early age~~ a ~~constitution~~ has a construction ~~that~~that the carbon heater ~~was~~is sealed ~~into~~ ~~a~~the quartz glass~~,~~ to prevent ~~it from~~ oxidizing ~~evne~~ in ~~the~~a high temperature environment.

According to Fig. 1 which is illustrating a front view of the ~~general~~ conventional carbon heating apparatus ~~of the prior art~~, it ~~the carbon heating apparatus of Fig.1~~ has a structure that the carbon fiber of the carbon heater (2) is sealed into a bar shaped ~~of the~~ quartz glass tube (1) and the ends of the quartz glass tube are melted and sealed ~~in the state of~~for stably connecting to the ~~terminals of~~ outside power supply lines ~~to both ends of the sealed carbon fiber to receive the power supply from the outside~~. In the ~~illustration~~ above illustration, the graphite felt cut ~~into~~ a predetermined length and sectional area is used as the

carbon fiber.

As shown in Fig.2~~However~~, the upper face of the carbon fiber such as the graphite felt is smoothly formed~~ as shown in Fig.2~~, while its rough cut of side surface has a lot of ~~since~~ minute carbon particles ~~are~~ exposed to the outside as shown in Fig.3~~,~~. ~~its side face has a shape capable of~~ The exposed particles are easily ~~being seceded~~separated by ~~effects from~~ the outside light impact. In the case of using the carbon heating apparatus ~~upon~~ for heating or cooking, despite precisely controlling and cutting the sectional area and length to ~~precisely~~ derive a required resistance ~~value~~ and a resulting ~~value of~~ a power consumption ~~power~~, many users would typically ~~use having the graphite felt~~ cut the graphite felt to~~by~~ a desired ~~region~~size and shape as needed by~~,~~ using tools such as a knife or scissors, etc.

At this time, ~~in state that~~ the minute carbon particles or the ~~no~~ unwoven pieces~~, having not been seceded yet~~produced from the ~~body of the~~ graphite felt cut~~,~~ are exposed ~~to the outside~~at the cutting surface~~,~~. ~~i~~If it is ~~immediately~~ sealed into the quartz glass tube without treatment, the exposed carbon particles~~pieces~~ are ~~joined with the~~melted inside of the quartz glass tube to produce unwanted arcs and ~~also to suppress~~interrupt the operating cycle ~~when the particles evaporated into the inside wall of~~ when the quartz glass tube ~~are~~ is heated~~,~~. ~~T~~Thereby, it will be ~~to have bad effect on~~negatively impacting the thermal efficiency and durability of a lamp~~,~~ and ~~a~~ the life of a machine.

On the other hand, ~~the~~ both ends of the carbon fiber processed as above use materials such as molybdenum or nickel to make a terminal~~, and~~ as a general method, it is processed to have ~~a~~ the shape of a spring.

In this case, ~~there are generated~~ it generates several problems due to contraction strength or compression strength. In the case of connecting ~~the~~ both ends of the carbon fiber using the spring shape of terminal, arc discharge maybe produced between the terminal and the carbon fiber materials ~~is produced discharge to~~ causeing contraction and expansion

~~actions~~ relative to each other, thereby ~~to~~ causing a short there~~-~~between or ~~secede~~ separation of the fiber itself from the terminal, ~~and to~~ increase~~ing~~ contact resistance there~~-~~between ~~to have bad affect~~and having a negative impact on durability.

SUMMARY OF THE INVENTION

The present invention ~~has been~~is proposed to solve the problems described above. ~~It is a~~An objective of the present invention is to provide a carbon heater with smooth surfaces ~~shape of a carbon heater~~ and a manufacturing method thereof, not having minute carbon particles or ~~no~~ unwoven pieces ~~capable of remaining in~~ remained on the outside of a graphite felt cut ~~in~~to a ~~predetermined~~ preset length and width~~, upon making the carbon heater using a carbon fiber such as the graphite felt~~.

~~It is~~ Another objective of the present invention is to prevent ~~a~~ unwanted local arcs ~~from occurring to allow~~ and smooth operating cycle ~~to smoothly progress~~ when the carbon heater is heated, thereby to enhance thermal efficiency and durability of the carbon heater, ~~wherein the local arc can be produced by the minute carbon particles or the no woven pieces remaining in the quartz glass tube into which the carbon heater is sealed,~~

~~It is~~Still another objective of the present invention is to improve ~~a~~ the structure of ~~a~~ terminal ~~fixing~~ fixtures for securely attaching both ends of the carbon heater to prevent ~~them~~ from ~~being seceded~~ separation ~~from it~~ due to contraction and expansion ~~actions~~ relative to each other, ~~thereby to previously prevent arc from occurring~~.

The other ~~objects~~ features of the present invention will be described ~~more~~ fully in conjunction with ~~constitutions~~ constructions and actions described below.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view showing a conventional ~~typical~~ carbon heating lamp.

Fig. 2 is a plane view showing a plane state after cutting a carbon fiber used in the conventional carbon heating lamp.

Fig. 3 is a side view showing a side surface state after cutting the carbon fiber used in the conventional carbon heating lamp.

Fig. 4 is a front view showing a carbon heating apparatus according to the present invention.

Fig. 5 is a partially enlarged perspective view showing a plane state and side surface state of the preferred carbon heater according to the present invention.

Fig. 6a is a plane view showing the first embodiment of terminal ~~portions~~ parts according to the present invention.

Fig. 6b is a side view showing the first embodiment of the terminal ~~portions~~ parts according to the present invention.

Fig. 6c is a front view showing the first embodiment of the terminal parts~~portions~~ according to the present invention.

Fig. 7a is a partially enlarged plane view showing the first embodiment of the terminal parts~~portions~~ according to the present invention.

Fig. 7b is a partially enlarged front view showing the first embodiment of the terminal parts~~portions~~ according to the present invention.

Fig. 8a is a plane view showing the second embodiment of the terminal parts~~portions~~ according to the present invention.

Fig. 8b is a side view showing the second embodiment of the terminal parts~~portions~~ according to the present invention.

Fig. 8c is a front view showing the second embodiment of terminal parts~~portions~~

according to the present invention.

Fig. 9a is a partially enlarged plane view showing the second embodiment of the terminal partsportions according to the present invention.

Fig. 9b is a partially enlarged side view showing the second embodiment of the terminal partsportions according to the present invention.

Fig. 10a is a plane view showing the third embodiment of the terminal partsportions according to the present invention.

Fig. 10b is a side view showing the third embodiment of the terminal partsportions according to the present invention.

Fig. 10c is a front view showing the third embodiment of the terminal partsportions according to the present invention.

Fig. 11a is a partially enlarged plane view showing the third embodiment of the terminal partsportions according to the present invention.

Fig. 11b is a partially enlarged side view showing the third embodiment of the terminal partsportions according to the present invention.

Fig. 12 is a flow chart showing a preferred manufacturing method of manufacturing the carbon heating apparatus device according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The carbon heating apparatus of the present invention to solve the problems as described above characterizing by comprisingcomprises: a carbon heater (20) processed bymade of cutting a predetermined carbon fiber cut inhaving a constant form to havewith a predetermined length and width and performing a heat treatment against for the side surface cut in a hydrogen gas atmosphere ofunder a predetermined high temperature to obtain

uniform surface cut structure; a pair of terminal ~~portions~~ parts (30) connected ~~with~~ to the outside power supply lines (40) of a predetermined material to provide an electrical connecting path to both ends of the carbon heater, the terminal parts having a flat portion (31) at one end for connecting to outside power supply lines by welding means and a pair of clamping brackets (32) with protrusions (33) at opposite end for securely attaching to the carbon heater; and a quartz glass tube (10) having melt~~ing joined~~ jointing portion (15)~~in state that the carbon heater is~~for sealeding ~~and the terminal portions are located at the~~ both ends of the carbon heater (20).

Preferably, ~~in~~ the carbon heater sealed into the quartz glass tube ~~is inserted~~includes a ribbon of molybdenum ~~having~~ of a predetermined thickness and width to prevent oxidation of the carbon ~~by~~ in case air ~~penetrated~~ leaks into the quartz glass tube ~~upon producing a leak therein.; thereby to protect functions of the heater, wherein the~~The ribbon of molybdenum preferably has ~~preferably~~ a thickness of 28μm to 30μm and a width of 3mm to 4mm.

Also, the carbon heater can be formed preferably in a bar shape having a tetragonal cross ~~section, wherein~~ section that one end of the terminal ~~portions~~ parts (30) is formed in a ~~circle of a~~ circular thin metal ~~thin film~~ for ~~surrounding~~ circumferentially attaching the carbon heater, while the other end of the terminal ~~portions~~ parts is extended from the ~~circle of the~~circular thin metal ~~thin film and~~ for welded~~ing~~ with the outside power supply lines.

~~Further,~~ Ssince the carbon heater uses mineral carbon materials such as coke or coal~~, and so on~~ to be capable of outputting about 800 watts ~~of a high output~~, it can be ~~constituted~~ constructed to ~~bear up against a~~withstand high temperatures ~~of heat~~.

Also, the method of manufacturing the carbon heating ~~apparatus~~device ~~manufacturing method~~ according to the present invention ~~characterizing by including~~comprises the steps of: forming a carbon heater by cutting a predetermined carbon fiber in a constant form to have a predetermined length and width; heat-treating the ~~cut~~ carbon heater cut in a hydrogen gas

atmosphere of a predetermined temperature under a high vacuum to ~~make~~ obtain~~its surface~~ uniform cutting surface; after ~~putting~~ inserting the carbon heater ~~heat-treated~~ into a quartz glass tube and injecting the hydrogen gas, baking it at a predetermined temperature to remove impurities; primary aging the baked carbon heater ~~baked~~ by applying a primary aging voltage ~~to it~~; secondary aging the carbon heater by applying a secondary aging voltage ~~to it~~; and after confirming the vacuum state, sealing the quartz glass tube.

Preferably, the process for cutting the carbon fiber may includes ~~a~~ press cutting, ~~or a~~ laser cutting ~~methods~~, and so on to ~~cleanly form its~~cut the side face ~~cut~~ as ~~much~~ clearly as possible.~~–~~

Also, the heat-treating ~~step~~ process is ~~made~~ performed for about 2 to 3 minutes in the hydrogen gas of 900℃ to 1000~~–~~℃ under a high vacuum of at least 10^{-5} Torr, the baking ~~step~~ process is ~~made~~ performed at the temperature of 1600℃ to 1700℃ to remove impurities, ~~and~~ the primary aging voltage ~~of~~ is 60V to 70V and the secondary aging voltage ~~of a rated voltage~~is 100V ~~may be applied~~.

The preferred embodiments of the present invention will be described ~~below more~~ fully with reference to the accompanying drawings.

In the following description of the preferred embodiments ~~of the invention~~, ~~detailed descriptions of~~the well-known functions or constitutions are omitted so as not to obscure the subject matters of the present invention with unnecessary detail. _The terms described below are established taking into account the functions of the present invention. ~~However, s~~Since the terms may be changed in accordance with manufacturer's intention or practice, the meanings of the terms should be defined based on the whole contents of the specification.

Fig. 4 is a front view showing a carbon heating apparatus according to the present invention, and Fig. 5 is a partially enlarged photograph showing ~~a~~ the side surface ~~state~~ of a preferred carbon heater according to the present invention.

Referring to Fig. 4, a quartz glass tube (10) uses ~~any one of~~either a quartz glass made by melting crystal, a quartz glass made from a high purity of $SiCl_4$, SiH_4, and so on as a starting ingredient, a quartz glass made by melting silica, ~~and~~ or a quartz glass made from silica glass as an ingredient.

In the case of using ~~the~~ quartz glass made from ~~the~~ silica glass as an ingredient, it is typical to make a film layer of the quartz glass~~,~~ by a method including the steps of: molding the silica glass at about 550℃ to 620℃; dividing~~–~~ into B_2O_3-Na_2O phase and SiO_2 phase; ~~making~~ performing an acid treatment with hydrochloric acid ~~etc.~~or the like; and ~~making~~ performing a heat~~ing~~ treatment process at about 1000℃ to 1200~~–~~℃~~,~~. ~~and –~~ O~~o~~ther methods are also available.~~–~~

Also, the quartz glass tube (10) of the present invention uses the purity 99.5% of SiO_2 and a working point of 1700~~–~~℃, as represented in Table 1.

Table 1

No	Ingredient	Coefficient of Thermal Expansion	Specific gravity	Stress point ℃	Annealing point ℃	Softening point ℃	Working Point ℃
1	99.5% of SiO_2	5.5	2.2	956	1084	1580	1700
2	Corning 1742	45		745	820	1015	1300
3	GE 180	44	2.64	674	726	928	1200

Also, the quartz glass tube (10) typically has a thickness of about 0.04mm to 3mm on average to obtain ~~an enough~~sufficient mechanical strength.

The most characteristic portion of the present invention is the carbon heater (20) sealed into the quartz glass tube (10), wherein the carbon heater (20) is ~~constituted~~ formed by cutting the graphite felt known as a carbon fiber ~~in~~to a desired length and a predetermined width ~~fitted~~ as required by the desired ~~with~~ resistance value.

The graphite felt used in the present invention is manufactured using mineral carbon

materials such as coke or coal, etc. _Since it is possible for ~~the use of the~~ mineral carbon materials to output ~~a high watt of a high output beyond a heating range capable of being emitted from~~far more heat than vegetable carbon materials, it is advantageous that the graphite felt can ~~bear up against a~~ withstand high temperatures ~~of heat~~ and can be designed to be ~~coincided~~ compatible with any rated voltages in the range of 100-V to 220V.

~~And, t~~The method for cutting the graphite felt may includes a press cutting method ~~using a press cutting~~, a dedicated jig~~,~~ or a wire cutting method that, to the extent possible, does not produce carbon particles or ~~no~~ unwoven pieces on the cut ~~side~~ surface ~~cut as much as possible~~.

The amount that the carbon particles or ~~the no~~ unwoven pieces are exposed to the outside is sharply reduced in the side surface of the carbon heater (20) that is cut by ~~the~~ press cutting, the dedicated jig~~,~~ or ~~the~~ wire cutting, in comparison with the method using scissors or a knife of the prior art. _However, ~~comparing that~~comparing to the smoothly formed upper surface of the carbon heater (20) ~~is smoothly formed~~, the section structure of the side surface ~~of which the section structure~~ is relatively rough ~~is formed. As the result~~ For this reason, the side surface cut is heat-treated for about 2 to 3 minutes in a hydrogen atmosphere of 900℃ to 1000℃ to change its physical properties, thereby to form ~~the~~ a side surface ~~similar to the~~that is just as smooth as the surface of the upper surface.

The carbon heater (20) is heat-treated before it is sealed into the quartz glass tube (10), thereby making its side surface smooth ~~simultaneously with~~as well as removing impurities remaining in its side surface. _As ~~the~~a result, ~~nothing remains~~no impurities are present~~,~~ upon inserting the heat-treated carbon heater (20) ~~heat-treated~~ into the quartz glass tube (10).

A terminal ~~portion~~ part (30) is constituted to connect the carbon heater (20) to the outside power supply line (40) for providing an electrical path and a mechanical connection.

The terminal partsportion (30) is preferably consistsed of metal materials such as molybdenum or nickel, wherein it may take various embodiments according to the invention as shown in Fig. 6A to Fig. 10. In Fig. 4, the terminal partsportion (30) takes are in the form of the first embodiment illustrated more fully in Fig. 6A to Fig. 7B.

According to Fig. 6A to Fig. 6C, one end is constituted intoof a terminal portion parts forms a flat plate (31) for connecting to a power supply, welded to the outside power supply line (40), while other the end is constituted intoof a terminal portion parts forms a pair of clamping brackets (32) for circumferentially wrapping the carbon heater., wherein Thus, the ends of the carbon heater (20) may be arrived safely and are securely fixed at and to the inside of the clamping brackets terminal portion (32).

The clamping brackets terminal portion (32) for the carbon heater isare further provided mounted with a pair of supporting protrusions (33) that can firmly clasp the carbon heater (20) arrived safelyto secure it at the inside and to prevent it from seceding separation easily.

Fig. 7A and Fig. 7B are partially enlarged views showing the terminal portion parts (30) according to the first embodiment. This configuration of the attachment bBetween the terminal portion parts (30) constituted as above and the carbon heater (20) is will not caused discharge unwanted arcs or sparks.

Accordingly, events,incidents such as a short caused by contraction and expansion actions relative to each other or the secession separation of the carbon fiber itself from the terminal parts, are not causedoccurred,. and Tthe contact surface is much wider than that of a conventional spring form terminals forto reduceing contact resistance and to enhanceing durability.

As shown in Fig. 8 to Fig. 11B, another type of the terminal parts are presented according toshow the second and the third embodiments of the terminal according to the

present invention~~,~~. ~~and~~ Fig. 8A to Fig. 9B show a connection member (50) between the terminal parts (30) and the outside power supply line (40). As shown in Fig. ~~10A~~ 10a to Fig. ~~11B~~ 11b, ~~show the constitution~~ another configuration ~~that~~ of the terminal ~~portion 32~~parts for surrounding the carbon heater ~~is formed~~ forms at least two circular thin metal parts (34) with bent up and down shape ~~parts~~(35) so that ~~the spring~~a pair of clamping bands (36) can be ~~fixed~~ installed ~~into its~~ at both end sides to prevent the carbon heater~~it~~ from ~~coming~~ loosening off.

~~Also, although not shown, making~~Although the conventional spring terminals (3) ~~of~~ adopts about 5mm, ~~into a~~the spring ~~terminal~~for the clamping bands (36) of the present invention ~~of~~ adopts 8mm to 10mm ~~can~~ that is significantly enhanced the durability.

~~On the one hand,~~ Fig. 12 is a flow chart showing a preferred ~~manufacturing~~ method of manufacturing the carbon heating ~~apparatus~~ device according to the present invention.

The method according to ~~the~~ Fig. 12 includes the steps of: forming the carbon heater by cutting the carbon fiber such as ~~the~~ a graphite felt into a constant form to have a predetermined length and width (step S1), wherein the length and width of the carbon heater is defined considering a desired resistance value, ~~and~~ density and the cutting method uses ~~the~~ press cutting or ~~the~~ laser cutting, etc.;

heat-treating the carbon heater cut in ~~the~~ step S1 for about 2 to 3 minutes in ~~the~~ a hydrogen gas atmosphere of 900℃ to 1000~~-~~℃ under a high vacuum of at least 10^{-5} Torr to ~~make~~ obtain ~~its surface~~ uniform cutting surface (step S2);

after ~~putting~~ inserting the heat-treated carbon heater into a quartz glass and injecting the hydrogen gas, baking it at predetermined temperature of 1600℃ to 1700℃ to remove impurities (step S3);~~-~~

primary aging the baked carbon heater ~~baked~~ in the step S3 by applying a primary aging voltage ~~to it~~ (step S4);

secondary aging the carbon heater that has undergone the primary aging by applying a secondary aging voltage ~~to it~~ (step S5); and_

sealing the inside of the quartz glass tube into which the carbon heater is sealed, after confirming a vacuum state, once the secondary aging is completed in the step S5 (step S6).~~,~~

~~wherein~~ When the quartz glass tube is sealed by ~~upon~~ melting and molding ~~the quartz glass tube~~, ~~it would typically use~~ a LPG O_2 burner would typically be used, but the present invention uses a high temperature hydrogen burner of ~~a high temperature of~~ 1500℃ to 1700℃ ~~as much as possible~~ to mold it in as short a time as possible ~~with~~while minimizing the effect on the carbon materials.

Assuming that the carbon heating apparatus is manufactured according to the present method, the cut side surface of the carbon heater ~~cut~~ is heat-treated in step S2 to make its surface properties uniform and at the same time to remove impurities, the carbon heater becomes stable through the aging processes of steps S4 and S5, and the quartz glass tube is ~~melting sealed~~fused in the shortest possible time using the hydrogen burner of a high temperature in step S6 to prevent stress from being exerted on the carbon materials.

Also, the other heat-treating method according to the present invention includes the steps of: heat-treating the cut carbon heater for about 2 hours under a high temperature of 300℃ in a process corresponding to ~~the~~ step S2, and then slowly cooling it for 1 hour to make the section structure of the side surface thereof stable; and ~~putting~~inserting it into the quartz glass tube and performing the baking and aging processes through ~~the~~ steps S3, S4 and S5.

After the vacuum process for the quartz glass tube is completed, dibromoethane of the mixed gas of methylene 0.25% and bromide 70% is injected ~~and sealed~~ into ~~it~~ the tube and then ~~its~~ both inlets are sealed. _After this, the carbon heater ~~in~~ which has undergone the aging ~~has been undergone~~ is heat-treated for about 2 hours under a high temperature of 300℃

Although the preferred embodiments of the present invention have been disclosed as describe above, those skilled in the art will appreciate that various modifications and changes are possible, without departing from the scope and spirit of the invention. The technical protective range will be defined by the accompanying claims

The invention can provide a ~~smooth shape of a~~ carbon heater with smooth surfaces not having minute carbon particles or ~~no~~ unwoven pieces capable of remaining in the outside of a graphite felt that has been cut ~~in~~to a predetermined length and ~~width, upon making the~~ width to make a carbon heater using ~~the~~a carbon fiber such as the graphite felt~~;~~ ~~and~~ Thus it will prevent ~~a local~~unwanted arcs and~~from occurring to~~ allowing smooth operating cycle ~~to smoothly progress~~ when the carbon heater is heated, thereby ~~to~~ enhanceing the thermal efficiency and durability of the carbon heater.~~,~~ ~~wherein the local arc can be produced by the minute carbon particles or the no woven pieces remaining in the quartz glass tube into which the carbon heater is sealed,~~ Comparing with the conventional carbon heater, the present carbon heater does not occur unwantedthe arcs due to the heat-treatment to remove the minute carbon particles or theno unwoven pieces remaining at the cutting surface.

Also, the invention improves ~~a~~the structure of ~~a~~ terminal ~~fixing~~ fixture to securely bond both ends of the carbon heater ~~of which the side face is improved through a heat treatment according to the invention~~ to prevent ~~them from being seceded from it~~separation due to the contraction and expansion ~~actions~~ relative to each other, thereby ~~to previously~~ preventing arcing between the terminal and the heater ~~from occurring~~.

Further, the present invention can manufacture a carbon lamp which can output ~~consumption power of~~ at least 800 W of power and which can be used even in voltage of at least 220V, wherein the lamp is widely applied to various industrial products such as a ~~roast~~ fish roasting ~~utensil~~appliance, a kitchen appliance~~utensil~~, an electric stove, a duplicator, an electric heat remedy appliance~~utensil~~, etc.

ABSTRACT

A carbon heating apparatus ~~using~~ utilizing a graphite felt and a method of manufacturing ~~method~~ thereof ~~is~~ are presented comprising~~ed of~~: ~~in~~ a carbon heater ~~used in equipment for heating a room or applying heat, and so on by an electrical heating characteristic~~made of a carbon fiber cut having a preset length and width, being performed heat treatment in a hydrogen gas atmosphere, ~~wherein the electrical heating characteristic is produced by sealing the carbon heater, formed by cutting the carbon fiber such as the graphite felt into a predetermined section and length, into a quartz glass tube, a particle structure on a side face, formed more unevenly over a particle structure on a plane by cutting a plane shape of the mineral carbon fiber into the predetermined section and length, becomes a stable structure by a predetermined process, i.e., a heat treating process; and an arch discharge or a terminal secession produced between the carbon heater and a feeding terminal can be prevented by using superior metals in contraction strength or compression strength, in both ends of the heat-treated carbon heater.~~ a pair of terminal parts having a flat portion (31) at one end for connecting to outside power supply lines and clamping brackets (32) with protrusions (33) at opposite end for securely attaching to the carbon heater, and a quartz glass tube (10) with melt-jointing potions (15) for sealing both ends of the carbon heater. The manufacturing method comprises the steps: forming a carbon heater by cutting carbon fiber in a preset size, heat-treating in a hydrogen gas under a high temperature and vacuum to have uniform cutting surface, inserting the heat-treated carbon heater into a quartz glass tube and injecting the hydrogen gas, baking at a high temperature to remove impurities, primary aging and secondary aging the carbon heater and sealing both ends of the quartz glass tube.